



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/689,986

10/22/2003

Youngho Ahn

GCTS-0029

8957

34610

7590

11/17/2004

FLESHNER & KIM, LLP

P.O. BOX 221200

CHANTILLY, VA 20153

EXAMINER

LAM, TUAN THIEU

ART UNIT

PAPER NUMBER

2816

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary**Application No.**

10/689,986

Applicant(s)

AHN ET AL.

Examiner

Tuan T. Lam

Art Unit

2816

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-15, 17-20, 22-31 and 33-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-15, 17-20, 22-31, 33-38, 44-48, 50-51, 53-55 is/are rejected.
- 7) ☒ Claim(s) 39-43, 49 and 52 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is a response to the amendment filed 9/20/2004. Claims 1-4, 6-15, 17-20, 22-31, 33-55 are under examination. The rejection of claims 10, 12, 26, 28, 40 and 42 under 35 USC 112, second paragraph have been withdrawn in view the amendment.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 6-13 and 22-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 is indefinite because it depends on the canceled claim 5.

Claim 22 is indefinite because it depends on the canceled claim 21.

- Claims 7-13 and 23-29 are indefinite because of the technical deficiencies of claims 6 and 22.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2816

Claims 1-4, 6-8, 14-15, 17-20, 22-24, 30-31, 33-38, 44-48, 50-51 and 53-55 are rejected under 35USC 102(e) as being anticipated by Tsuda et al. (US 2003/0062959), prior art of record.

Figure 1 of Tsuda et al. shows a noise suppression circuit comprising method of generating a frequency signal (OUT) from PLL based on a reference signal (REF), and removing noise from the frequency signal by setting a frequency divider in a feedback loop of the PLL to a value which shifts a spurious signal of predetermined order outside a loop bandwidth of the PLL (Paragraph 0089 states that by controlling the sequence n the pattern of spurious noise is removed. Of course, the sequence n controls the frequency divider 5 in the feedback loop of the PLL. Paragraph 0102 further states that spurious noise is removed by shifting it an amount of $/F/M-1/2/ \times \text{fref}$. Choosing ratio F/M controls the sequence n and thus the frequency divider (6) and determines the shifted frequency $/F/M-1/2/\text{fref}$ will be so that the spurious noise in the frequency signal removed by the low pass filter) as called for in claims 1, 17 and 33.

Regarding claims 2, 18 and 34, the loop bandwidth is defined by a cutoff frequency of a loop filter in the PLL.

Regarding claims 3, 19 and 35, the loop bandwidth corresponds to a frequency range lies between the frequency signal generated from the PLL and a cutoff frequency of a loop filter in the PLL.

Regarding claims 4, 20 and 36, shifting a first order spurious signal outside the loop bandwidth ($/F/M-1/2/ \times \text{fref}$) of the PLL.

Regarding claims 6, 22 and 37, the frequency divider is set by the Sigma Delta modulator (6).

Regarding claims 7, 23 and 38, the frequency divider (5) of Tsuda is a fractional integer divider inherently having a pulse swallow frequency divider 111 as shown figure 14a..

Regarding claims 8, 24, the computed modulation ratio F/M is based on the loop bandwidth of the PLL, and the setting values of the pulse swallow frequency divider (counter 111 of the modulator control circuit 11 of figures 13 and 14) based on the modulated ratio computed for the sigma delta modulator.

Regarding claims 14, 30, 44 and 45, the spurious noise is generated relating to the mismatch of the phase comparator.

Regarding claims 46 and 47, the circuit of Tsuda et al. is capable of generating spurious noise from the mismatch between the Up and Down current sources of the charge pump and the mismatch between the Up and Down signal paths in the phase comparator..

Regarding claim 48, the frequency divider is set based on the modulation ratio F/M for removing the spurious noise.

Regarding claim 50, paragraph 0193 of Tsuda et al. states that when the modulation ratio is in this range $1/4 \leq F/M \leq 1/2$ the spurious noise can be removed. Thus, the modulation ratio defined in claim 50 is about $1/2$ lied in the between the range where the spurious noise can be removed. Therefore, the limitations of claim 50 are fully met.

Regarding claim 51, figure 17 shows the reference signal is modulated by the modulator circuits 7 and 14 using the modulation ratio F/M . Same principle applied here, when modulation ratio is in this range $1/4 \leq F/M \leq 1/2$ the spurious noise can be removed. Thus, the modulation ratio defined in claim 51 is about $1/2$ lied in the between the range where the spurious noise can be removed. Therefore, the limitations of claim 51 are fully met.

Regarding claims 53 and 55, the fractional value is seen as the ratio F/M .

Regarding claim 54, the frequency shifter is seen as the modulator circuit 7 of figure 1.

Regarding claims 15 and 31, figure 1 of Tsuda et al. shows a method for suppressing noise in a frequency generator (PLL) comprising step of modulating the reference signal (7), generating a frequency signal (OUT) from a PLL based on the modulated reference signal (REFM), wherein modulating the reference frequency generates a frequency separation between harmonics of the modulated reference signal and the reference signal that suppresses noise in the frequency signal, wherein the modulated reference signal is used to generate the frequency signal from the PLL as long as the harmonics of the modulated reference is not coincident with the harmonics of the reference signal (figures 4a and 4b show harmonic frequency $N \times f_{ref}$ of the reference signal is not coincident with the harmonic component $(N+1/2) \times f_{ref}$ of the modulated frequency REFM).

Allowable subject matters

4. Claims 9-13 and 25-29 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
5. Claims 39-43, 49 and 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

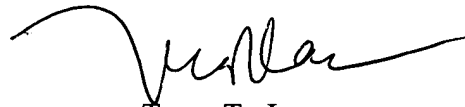
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T. Lam whose telephone number is 571-272-1744. The examiner can normally be reached on Monday to Friday (7:30 am to 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TIMOTHY P CALLAHAN can be reached on 571-272-1740. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2816

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tuan T. Lam
Primary Examiner
Art Unit 2816

11/15/2004